

Appl. No. 10/798,677
Amdt. C dated June 5, 2008
Reply to non-final O.A. of March 21, 2008

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Amendments to the Claims:

The following listing of claims replaces all prior versions and listings of claims in the application:

1. (currently amended) A system for determining a global position of an anatomical structure of a patient's body, comprising:
 - a surgical navigation system;
 - a substrate adapted to be removably mounted to an outer surface of a user's body;
 - a sensor attached to the substrate that can be tracked by the surgical navigation system;
 - a positional device attached to the substrate;
 - a structure adapted to be mounted to a finger of the user, wherein the structure is movable in relation to the sensor, and wherein the positional device is adapted to determine a relative position of the structure in relation to the positional device; and
 - a first circuit for calculating a global position of [[the]] a point on the anatomical structure by correlating a position of the sensor and the relative position of the structure.
2. (original) The system of claim 1, wherein a second circuit is provided for displaying the global position of the point on the anatomical structure.
3. (currently amended) The system of claim 1, wherein the structure is attached to the substrate and the substrate is sufficiently flexible to enable the structure to reach a point on the anatomical structure that is obstructed from view.
4. (currently amended) The system of claim 1, wherein tactile feedback to the user aids the user in maneuvering the structure so that [[the]] a position of the structure correlates to the point on the anatomical structure.
5. (original) The system of claim 1, wherein the anatomical structure is mapped by concatenating the position of a plurality of points.

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6. (previously presented) The system of claim 1, wherein the substrate comprises a glove and the structure comprises a fingertip of the glove.
7. (previously presented) The system of claim 1, wherein the structure comprises a pointer.
8. (previously presented) The system of claim 7, wherein the pointer includes a depressible tip.
9. (original) The system of claim 8, wherein depressing the depressible tip activates the positional device.
10. (original) The system of claim 9, wherein the depressible tip includes a transducer for activating the positional device when a defined pressure value is met.
11. (currently amended) The system of claim 8, wherein [[the]] a position of the structure that correlates to the point on the anatomical structure is a position of the depressible tip.
12. (currently amended) The system of claim 1, wherein [[the]] a position of the structure that correlates to the point on the anatomical structure is a position of a tip of the structure.
13. (previously presented) The system of claim 12, wherein the tip of the structure is located at a tip of a glove fingertip.
14. (previously presented) The system of claim 12, wherein the tip of the structure is located adjacent a pad of a glove fingertip.
15. (previously presented) The system of claim 12, wherein the tip of the structure is located anywhere along the length of the structure.

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16. (original) The system of claim 1, wherein the substrate includes a switch to activate the positional device.
17. (original) The system of claim 16, wherein the switch is located in the palm of a hand.
18. (original) The system of claim 1, wherein the sensor is an optical tracking device.
19. (original) The system of claim 1, wherein the anatomical structure is a bony structure.
20. (previously presented) The system of claim 1, wherein the first circuit is adapted to calculate the global position of the point when the substrate moves in relation to the point.
21. (original) The system of claim 1, wherein the positional device comprises a magnetic tracker.
22. (original) The system of claim 1, wherein the positional device comprises a fiber optic device.

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23. (previously presented) A method for determining a position of a point on an anatomical structure of a patient using a surgical navigation system, the method comprising the steps of:

- mounting a substrate in a removable manner to an outer surface of a user's body, the substrate having a positional device and a sensor that can be detected by the surgical navigation system;
- covering a fingertip of the user with a finger mounted structure, wherein the finger mounted structure is movable in relation to the sensor, and wherein the positional device is adapted to determine a relative position of the finger mounted structure with respect to the positional device;
- placing the finger mounted structure on the point of the anatomical structure to be determined;
- calculating the relative position of the finger mounted structure in relation to the positional device; and
- determining the position of the point from the relative position of the finger mounted structure.

24. (original) The method of claim 23, wherein a first circuit calculates a global position of the point on the anatomical structure by correlating the position of the point on the anatomical structure and a position of the sensor.

25. (original) The method of claim 24, wherein a second circuit is provided for displaying the global position of the point on the anatomical structure.

26. (original) The method of claim 23, wherein a tip of the finger mounted structure is placed on the point of the anatomical structure to be determined.

27. (original) The method of claim 26, wherein the tip of the finger mounted structure is located adjacent a tip of the user's finger.

28. (original) The method of claim 26, wherein the tip of the finger mounted structure is located adjacent a pad of the user's finger.

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29. (original) The method of claim 26, wherein the tip of the finger mounted structure is located anywhere along the length of the finger mounted structure.

30. (currently amended) The method of claim 23, wherein the finger mounted structure is attached to the substrate and the substrate comprises a glove that is sufficiently flexible to enable the finger mounted structure to reach a point on the anatomical structure that is obstructed from view.

31. (original) The method of claim 23, wherein tactile feedback to the user aids the user in maneuvering the finger mounted structure so that a position of the finger mounted structure correlates to the point on the anatomical structure.

32. (original) The method of claim 23, wherein the anatomical structure is mapped by concatenating the position of a plurality of points.

33. (previously presented) The method of claim 23, wherein the outer surface of the user's body is a hand, and wherein the substrate comprises a flexible glove and the finger mounted structure is a fingertip of the flexible glove.

34. (original) The method of claim 23, wherein the finger mounted structure comprises a finger mounted pointer.

35. (original) The method of claim 34, wherein the finger mounted pointer includes a depressible tip.

36. (original) The method of claim 35, wherein depressing the depressible tip activates the positional device.

37. (original) The method of claim 36, wherein the depressible tip includes a transducer for activating the positional device when a defined pressure value is met.

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38. (original) The method of claim 35, wherein the depressible tip is placed on the point of the anatomical structure to be determined.

39. (original) The method of claim 23, wherein the substrate includes a switch to activate the positional device.

40. (original) The method of claim 39, wherein the switch is located on the palm of a hand.

41. (original) The method of claim 23, wherein the user may utilize a second tool, and wherein the concurrent use saves the user time.

42. (original) The method of claim 41, wherein the position of the point is determined at the same time the second tool is being used.

43. (previously presented) The method of claim 23, further comprising the steps of making an incision in a patient's body containing the anatomical structure, and reaching through the incision with the finger mounted structure to touch the point of the anatomical structure.

44. (original) The method of claim 43, wherein the incision has a length less than 10 centimeters.

45. (original) The method of claim 43, wherein the incision has a length less than 5 centimeters.

46. (original) The method of claim 43, wherein the incision has a length between about 2.5 centimeters and about 5 centimeters.

47. (original) The method of claim 43, wherein the incision is made in a region of a knee of the patient's body.

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48. (original) The method of claim 43, wherein the incision is made in a region of a hip of the patient's body.

49. (original) The method of claim 23, wherein the sensor is an optical tracking device.

50. (original) The method of claim 23, wherein the anatomical structure is a bony structure.

51. (original) The method of claim 23, wherein the anatomical structure is an organ.

52. (original) The method of claim 23, wherein the positional device comprises a magnetic tracker.

53. (original) The method of claim 23, wherein the positional device comprises a fiber optic device.

54. (currently amended) A system for determining a global position of an object, comprising:

a navigation system;

a substrate comprising a glove adapted to be mounted to an outer surface of a user's body;

a sensor attached to the substrate that can be tracked by the navigation system;

a positional device attached to the substrate ~~that can determine a position of a point on the object;~~

structure mounted to a finger of the glove, wherein the structure is movable in relation to the sensor, and wherein the positional device is adapted to determine a relative position of the structure in relation to the positional device; and

a first circuit for calculating a global position of a point on the object by correlating a position of the sensor and the relative position of the structure.

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55. (original) The system of claim 54, wherein a second circuit is provided for displaying the global position of the point on the object.

56. (previously presented) The system of claim 54, wherein the substrate is sufficiently flexible to enable the structure to reach a point on the object that is obstructed from view.

57. (previously presented) The system of claim 54, wherein tactile feedback to the user aids the user in maneuvering the structure so that the position of the structure correlates to the point on the object.

58. (original) The system of claim 54, wherein the object is mapped by concatenating the position of a plurality of points.

59. (previously presented) The system of claim 54, wherein the finger of the glove is separated from other portions of the substrate.

60. (previously presented) The system of claim 54, wherein the structure comprises a pointer.

61. (previously presented) The system of claim 60, wherein the pointer includes a depressible tip.

62. (original) The system of claim 61, wherein depressing the depressible tip activates the positional device.

63. (original) The system of claim 62, wherein the depressible tip includes a transducer for activating the positional device when a defined pressure value is met.

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64. (previously presented) The system of claim 61, wherein the position of the structure is a position of the depressible tip.

65. (previously presented) The system of claim 54, wherein the position of the structure is a position of a tip of the structure.

66. (previously presented) The system of claim 65, wherein the tip of the structure is located at a tip of the user's finger.

67. (previously presented) The system of claim 65, wherein the tip of the structure is located at a pad of the user's finger.

68. (previously presented) The system of claim 65, wherein the tip of the structure is located anywhere along the length of the structure.

69. (original) The system of claim 54, wherein the substrate includes a switch to activate the positional device

70. (original) The system of claim 69, wherein the switch is located on the palm of a hand.

71. (original) The system of claim 54, wherein the sensor is an optical tracking device.

72. (original) The system of claim 54, wherein the positional device comprises a magnetic tracker.

73. (original) The system of claim 54, wherein the positional device comprises a fiber optic device.

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74. (previously presented) A method for determining a position of a point on an object using a navigation system, the method comprising the steps of:

mounting a glove on a user's hand, the glove having a positional device that determines a position of a point on the object and a sensor that can be detected by the surgical navigation system;
disposing a finger mounted structure on a finger of the glove capable of communicating with the positional device, wherein the finger mounted structure is movable in relation to the sensor;
placing the finger mounted structure on the point of the object to be determined; and
determining the position of the point.

75. (currently amended) The method of claim 74, wherein a first circuit calculates a global position of the point on the object by correlating the position of the point on the object and ~~[[the]]~~ a position of the sensor.

76. (previously presented) The method of claim 75, wherein a second circuit is provided for displaying the global position of the point on the object.

77. (previously presented) The method of claim 74, wherein the glove is sufficiently flexible to enable the finger mounted structure to reach a point on the object that is obstructed from view.

78. (original) The method of claim 74, wherein tactile feedback to the user aids the user in maneuvering the finger mounted structure so that a position of the finger mounted structure correlates to the point on the object.

79. (original) The method of claim 74, wherein the object is mapped by concatenating the position of a plurality of points.

80. (canceled)

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81. (original) The method of claim 74, wherein the finger mounted structure comprises a finger mounted pointer.

82. (original) The method of claim 81, wherein the finger mounted pointer includes a depressible tip.

83. (original) The method of claim 82, wherein depressing the depressible tip activates the positional device.

84. (original) The method of claim 83, wherein the depressible tip includes a transducer for activating the positional device when a defined pressure value is met.

85. (original) The method of claim 82, wherein the depressible tip is placed on the point of the object to be determined.

86. (original) The method of claim 74, wherein a tip of the finger mounted structure is placed on the point of the object to be determined.

87. (original) The method of claim 86, wherein the tip of the finger mounted structure is located adjacent a tip of the user's finger.

88. (original) The method of claim 86, wherein the tip of the finger mounted structure is located adjacent a pad of the user's finger.

89. (original) The method of claim 86, wherein the tip of the finger mounted structure is located anywhere along the length of the finger mounted structure.

90. (original) The method of claim 74, wherein the user may utilize a second tool, and wherein the concurrent use saves the user time.

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91. (original) The method of claim 90, wherein the position of the point is determined at the same time the second tool is being used.

92. (original) The method of claim 74, wherein the sensor is an optical tracking device.

93. (original) The method of claim 74, wherein the positional device comprises a magnetic tracker.

94. (original) The method of claim 74, wherein the positional device comprises a fiber optic device.

95. (previously presented) An apparatus for determining a position of a point on an anatomical structure, comprising:

a glove adapted to be mounted on a hand of a user;

a sensor and a magnetic tracker attached to the glove;

a structure comprising a magnetic sensor mounted to a finger of the glove, wherein the magnetic sensor is movable in relation to the sensor, and wherein the magnetic tracker determines a relative position of the magnetic sensor;

a first circuit for calculating the position of the point on the anatomical structure by correlating a position of the sensor and the relative position of the magnetic sensor.

96. (previously presented) The apparatus of claim 95, wherein the glove is sufficiently flexible to enable the structure to reach a point on the anatomical structure that is obstructed from view.

97. (previously presented) The apparatus of claim 95, wherein tactile feedback to the user aids the user in maneuvering the structure so that a position of the structure correlates to a point on the anatomical structure.

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98. (previously presented) The apparatus of claim 95, wherein the magnetic sensor is mounted on a tip of the structure, and wherein the tip is maneuvered by the user adjacent the point on the anatomical structure to be determined.

99. (previously presented) The apparatus of claim 98, wherein the tip of the structure is located adjacent a tip of a user's finger.

100. (previously presented) The apparatus of claim 98, wherein the tip of the structure is located adjacent a pad of the user's finger.

101. (previously presented) The apparatus of claim 98, wherein the tip of the structure is located anywhere along the length of the structure.

102. (canceled)

103. (previously presented) The apparatus of claim 95, wherein the structure comprises a pointer mounted on a finger of the glove, and the magnetic sensor is disposed adjacent the pointer.

104. (previously presented) The apparatus of claim 103, wherein the pointer includes a depressible tip.

105. (previously presented) The apparatus of claim 104, wherein depressing the depressible tip activates the magnetic tracker.

106. (previously presented) The apparatus of claim 105, wherein the depressible tip includes a transducer for activating the magnetic tracker when a defined pressure value is met.

107. (previously presented) The apparatus of claim 104, wherein the depressible tip of the structure is maneuvered by the user adjacent the point on the anatomical structure to be determined.

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108. (original) The apparatus of claim 95, wherein the sensor is an optical tracking device.

109-110. (canceled)

111. (currently amended) A method for determining a position of a point on an anatomical structure through a small incision opening using a surgical navigation system, wherein the point is obstructed from the incision, the method comprising the steps of:

mounting a substrate in a removable manner to an outer surface of a user's body;

covering a tip of the user's finger with a finger mounted pointer having a rigid tip, the finger mounted pointer being capable of communicating with an external positional device mounted on the substrate ~~in moving proximity to the incision opening~~, the external positional device being associated with a sensor mounted on the substrate that can be detected by the surgical navigation system, and wherein the finger mounted pointer is movable in relation to the sensor;

manipulating the finger mounted pointer so that the rigid tip is in contact with the point to be determined;

determining the relative position of the finger mounted pointer in relation to the sensor with the external positional device;

determining the global position of the sensor; and

determining the global position of the point from the relative position of the finger mounted pointer and the global position of the sensor.

112. (canceled)

113. (currently amended) The method of claim ~~[[112]]~~ 111, further comprising the step of displaying the global position of the point on the anatomical structure.

114. (previously presented) The method of claim 111, wherein the substrate comprises a flexible glove.

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115. (original) The method of claim 111, wherein tactile feedback to the user aids the user in maneuvering the finger mounted pointer so that a position of the rigid tip correlates to the point to be determined.

116. (previously presented) The method of claim 111, further comprising the step of mapping the anatomical structure by concatenating the position of a plurality of points.

117. (original) The method of claim 111, wherein the finger mounted pointer includes a depressible tip.

118. (previously presented) The method of claim 117, further comprising the step of depressing the depressible tip to activate the positional device.

119. (original) The method of claim 118, wherein the depressible tip includes a transducer for activating the positional device when a defined pressure value is met.

120. (original) The method of claim 117, wherein the depressible tip comprises the rigid tip of the finger mounted pointer.

121. (original) The method of claim 111, wherein the rigid tip of the finger mounted pointer is located adjacent a tip of the user's finger.

122. (original) The method of claim 111, wherein the rigid tip of the finger mounted pointer is located adjacent a pad on the user's finger.

123. (original) The method of claim 111, wherein the rigid tip of the finger mounted pointer is located anywhere along the length of the finger mounted pointer.

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124. (original) The method of claim 111, wherein the user may utilize a second tool, and wherein the concurrent use saves the user time.

125. (original) The method of claim 124, wherein the position of the point is determined at the same time the second tool is being used.

126. (canceled)

127. (currently amended) The method of claim ~~[[111]]~~ 137, wherein the small incision opening is less than 10 centimeters in length.

128. (currently amended) The method of claim ~~[[111]]~~ 137, wherein the small incision opening is less than 5 centimeters.

129. (currently amended) The method of claim ~~[[111]]~~ 137, wherein the small incision opening is between about 2.5 centimeters and about 5 centimeters.

130. (currently amended) The method of claim ~~[[111]]~~ 137, wherein the small incision is made in a region of a knee of the patient's body.

131. (currently amended) The method of claim ~~[[111]]~~ 137, wherein the small incision is made in a region of a hip of the patient's body.

132. (original) The method of claim 111, wherein the sensor is an optical tracking device.

133. (original) The method of claim 111, wherein the anatomical structure is a bony structure.

134. (original) The method of claim 111, wherein the anatomical structure is an organ.

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135. (original) The method of claim 111, wherein the positional device comprises a magnetic tracker.

136. (original) The method of claim 111, wherein the positional device comprises a fiber optic device.

137. (reinstated – formerly claim 126.) The method of claim 111, wherein the small incision is made in a patient's body containing the anatomical structure.